

REMARKS

Claims 1 - 43 are presently pending. In the above-identified Office Action, the Claims were rejected under 35 U.S.C. §102(b) or (e) and 35 U.S.C. §103 as being unpatentable over Wood, Hounam *et al.*, Hanni *et al.*, Adam *et al.*, Yamashita, or Rozin.

By this Amendment, Applicant has entered minor technical corrections to the Specification and amended Claims 1, 29 and 43 to more clearly define the patentably distinct limitations thereof. In addition, new Claims 44 through 48 have been added for consideration. For the reasons set forth more fully below, Applicant respectfully submits that the subject application properly presents Claims patentable over the prior art. Accordingly, reconsideration, allowance and passage to issue are respectfully requested.

The present invention addresses the need in the art for a more robust, consistent, versatile RF tag capable of transmitting more data than conventional RF tags with a low probability of detection, while using less power. Generally, the inventive system includes a first subsystem for receiving a first electromagnetic signal; a second subsystem for analyzing the electromagnetic signal to **identify a format of the received signal and provide** data with respect thereto; a third subsystem responsive to the data for synthesizing a second electromagnetic signal; and a fourth subsystem for automatically transmitting the second electromagnetic signal.

Those skilled in the art will appreciate that the use of a synthesized reply signal, as opposed to a recorded and modified transmit signal as a reply signal, allows for the transmission of the cleaner (noise free) reply signal. In addition, other data including voice and video may be impressed onto the reply signal with high efficiency digital codes. The use of a narrow band receiver and data acquisition minimizes power consumption and extends battery life.

The invention is set forth in Claims of varying scope, of which Claim 1, as amended, is illustrative. Claim 1 now reads as follows:

1. A system for providing an automatic reply to a first electromagnetic signal comprising:
 - first means for receiving said first electromagnetic signal;
 - second means for analyzing said electromagnetic signal to **identify a format of the received signal** and provide data with respect thereto;
 - third means **responsive to said data for synthesizing** a second electromagnetic signal; and
 - fourth means for automatically transmitting said second electromagnetic signal. (Emphasis added.)

None of the references, taken alone or in combination, teaches, discloses or suggests the invention as presently claimed. That is, none of the references, taken alone or in combination, teaches, discloses or suggests a system for providing an automatic reply to electromagnetic signal having means for identifying a format of the received signal which is used to synthesize a reply.

The references cited by the Examiner are essentially conventional RF tags. As such, these devices are generally transponders which simply retransmit the received signal.

Wood and Rozin appear to teach conventional RF tags. Hounam *et al.* purport to teach a device for locating and identifying objects using an encoding transponder in combination with a synthetic aperture radar device carried on aircraft or spacecraft. Hanni *et al.* purport to teach an identification friend or foe system using a transponder adapted for radio telephony installations. Adam *et al.* purport to teach the use of a table of values to harden transmissions in both directions between a master station and a slave station. The Yamashita reference endeavors to teach the provision of a slick function in a vehicle not device for use in a road-to-vehicle-communication system.


No means are provided in any of these references, alone or in combination, for analyzing the received signal to ascertain its format with respect to such parameters as pulse repetition frequency (PRF), pulse width, signal strength, pulse modulation, Doppler shift, or other signal parameters by way of example. Further, no means are provided for synthesizing a signal based on the detected format of the received signal as presently

claimed. The synthesis of a reply signal allows for the creation of reply signal with a low probability of intercept and allows for uplink data to be impressed on the reply signal.

Numerous additional patentably distinct limitations are recited in Claims 2 through 48. For example, note that in Claim 42 a signal generator is recited for synthesizing the reply signal. None of the references show and RF tag with a signal generator for synthesizing a reply signal.

Accordingly, Applicant respectfully submits that the presently pending claims properly define an invention patentable over the prior art. Reconsideration, allowance and passage to issue are therefore respectfully requested.

Respectfully submitted,
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Paragraph beginning at page 1, line 19 has been amended as follows:

Radio frequency (RF) tags are well-known in the art. RF tags are small electronic devices that ~~receive~~ receive and recognize radar signals of a particular type and generate and transmit a reply in response thereto. When received by the transmitting radar, the reply is decoded to ascertain the identity and location of the RF tag.

Paragraph beginning at page 1, line 23 has been amended as follows:

Conventional RF tags were simple repeaters designed to receive ~~and report~~ synthetic aperture radar (SAR) signals, shift the signal in Doppler, and transmit a reply with respect ~~thereto~~ thereusing thereto using a technique known as "digital radio frequency memory" (DRFM). These devices also typically perform simple modifications of the received signal; to send additional useful information.

Paragraph beginning at page 2, line 9 has been amended as follows:

While this problem may be addressed to some extent by the use of a broadening modulation with a long pulse swept over a wide frequency band coupled with phase coding on the reply signal, this approach requires more energy for the reply signal to be decoded reliably at the aircraft. This broadening a waveform allows for the reply signal to be more easily discriminated relative to the reflections generated by the surrounding terrain and thus detected. The combination of higher energy levels and higher observeability of the reply signal renders this approach unattractive for the target application for RF tags. In addition, ~~he~~ the higher power levels further limit battery life.

Paragraph beginning at page 2, line 18 has been amended as follows:

Thirdly, conventional RF tag ~~designed~~ design is limited with respect to the types of radar signals that may be answered...

IN THE CLAIMS:

Claim 1 has been amended as follows:

1. (Amended) A system for providing an automatic reply to a first electromagnetic signal comprising:

first means for receiving said first electromagnetic signal;

second means for analyzing said electromagnetic signal to identify a format of the received signal and provide ~~extract~~ data with respect thereto;

third means responsive to said data for synthesizing a second electromagnetic signal; and

fourth means for automatically transmitting said second electromagnetic signal.

Claim 29 has been amended as follows:

29. (Amended) The invention of Claim 1 wherein said second means includes means for transmitting said second electromagnetic signal during a time interval ~~decoded~~ from based on said analysis of said first electromagnetic signal.

Claim 43 has been amended as follows:

43. (Amended) A method for providing an automatic reply to a first electromagnetic signal including the steps of:

receiving said first electromagnetic signal;

analyzing said electromagnetic signal to identify a format of the received signal
and provide ~~extract~~ data with respect thereto;

synthesizing a second electromagnetic signal in response to said data; and
automatically transmitting said second electromagnetic signal.

The following new Claims have been added:

-- 44. The invention of Claim 1 further including means for comparing the format
of the received signal to a database and providing an output in response thereto. --

-- 45. A system for providing an automatic reply to a first electromagnetic signal
comprising:

means for receiving a surveillance radar signal;
means for recognizing the format of said signal;
means for decoding data encoded on said radar signal; and
means for synthesizing a modified radar signal in response to the recognized
format of said signal. --

-- 46. ~~The invention of Claim 45~~ further including means for encoding data on
said synthesized signal. --

-- 47. The invention of Claim 46 further including means for determining a pattern
of incident radio frequency energy of said signal in time and frequency. --

-- 48. The invention of Claim 47 including means responsive to said means for
determining a pattern of incident radio frequency energy of said signal in time and
frequency for encoding said uplink signal such that it is indistinguishable from energy
reflected by surrounding terrain. --